

1 METHOD AND SYSTEM FOR GENERATING
2 STATISTICALLY-BASED MEDICAL PROVIDER
3 UTILIZATION PROFILES
4
5

6 MICROFICHE APPENDIX This specification includes a
7 Microfiche Appendix which includes 1 page of microfiche with
8 a total of 37 frames. The microfiche appendix includes
9 computer source code of one preferred embodiment of the
10 invention. In other embodiments of the invention, the
11 inventive concept may be implemented in other computer code,
12 in computer hardware, in other circuitry, in a combination of
13 these, or otherwise. The Microfiche Appendix is hereby
14 incorporated by reference in its entirety and is considered
15 to be a part of the disclosure of this specification.
16
17

18 I. BACKGROUND OF INVENTION

19 A. Field of the Invention

20 The invention relates to methods and systems for analyzing
21 medical claims histories and billing patterns to
22 statistically establish treatment utilization patterns for
23 various medical services. Data is validated using
24 statistical and clinically derived methods. Based on
25 historical treatment patterns and a fee schedule, an accurate
26 model of the cost of a specific medical episode can be
27 created. Various treatment patterns for a particular
diagnosis can be compared by treatment cost and patient

1 outcome to determine the most effective treatment approach.

2 It is also possible to identify those medical providers who
3 provide treatment that does not fall within the statistically
4 established treatment patterns or profiles.

5
6 **B. The Background Art**

7 It is desirable to compare claims for reimbursement for
8 medical services against a treatment pattern developed from a
9 large body of accurate medical provider billing history
10 information. Although in the prior art some attempt was made
11 to compare claims for reimbursement for medical services to a
12 normative index, the prior art did not construct the
13 normative index based on actual clinical data. Rather, the
14 prior art based the normative index on a subjective
15 conception (such as the medical consensus of a specialty
16 group) of what the proper or typical course of treatment
17 should be for a given diagnosis. Such prior art normative
18 indices tended to vary from the reality of medical practice.
19 In the prior art, automated medical claims processing
20 systems, systems for detecting submission of a fraudulent
21 medical claims, and systems for providing a medical baseline
22 for the evaluation of ambulatory medical services were known.
23 Documents which may be relevant to the background of the
24 invention, including documents pertaining to medical
25 reimbursement systems, mechanisms for detecting fraudulent

1 medical claims, and related analytical and processing
2 methods, were known. Examples include: United States Patent
3 No. 4,858,121, entitled "Medical Payment System" and issued
4 in the name Barber et al. on August 15, 1989; No. 5,253,164,
5 entitled "System and Method for Detecting Fraudulent Medical
6 Claims Via Examination of Service Codes" and issued in the
7 name of Holloway et al. on October 12, 1993; No. 4,803,641,
8 entitled "Basic Expert System Tool" and issued in the name of
9 Hardy et al. on February 7, 1989; No. 5,658,370, entitled
10 "Knowledge Engineering Tool" and issued in the name of Erman
11 et al. on April 14, 1987; No. 4,667,292, entitled "Medical
12 Reimbursement Computer System" and issued in the name of
13 Mohlenbrock et al. on May 19, 1987; No. 4,858,121, entitled
14 "Medical Payment System" and issued in the name of Barber et
15 al. on August 15, 1989; and No. 4,987,538, entitled
16 "Automated Processing of Provider Billings" and issued in the
17 name of Johnson et al. on January 22, 1991, each of which is
18 hereby incorporated by reference in its entirety for the
19 material disclosed therein.

20 Additional examples of documents that may be relevant to
21 the background of the invention are: Leape, "Practice
22 Guidelines and Standards: An Overview," ORB (Feb. 1990);
23 Jollis et al., "Discordance of Databases Designed for Claims
24 Payment versus Clinical Information Systems," Annals of
25 Internal Medicine (Oct. 15, 1993); Freed et al., "Tracking

1 Quality Assurance Activity," American College of Utilization
2 Review Physicians (November, 1988); Roberts et al., "Quality
3 and Cost-Efficiency," American College of Utilization Review
4 Physicians (November, 1988), Rodriguez, "Literature Review,"
5 Quality Assurance and Utilization Review - Official Journal
6 of the American College of Medical Quality (Fall 1991);
7 Elden, "The Direction of the Healthcare Marketplace," Journal
8 of the American College of Utilization Review Physicians
9 (August 1989); Rodriguez, "Literature Review," Quality
10 Assurance and Utilization Review - Official Journal of the
11 American College of Medical Quality (Fall 1991); Roos et al.,
12 "Using Administrative Data to Predict Important Health
13 Outcomes," Medical Care (March 1988); Burns et al., "The Use
14 of Continuous Quality Improvement Methods in the Development
15 and Dissemination of Medical Practice Guidelines, ORB
16 (December, 1992); Weingarten, "The Case for Intensive
17 Dissemination: Adoption of Practice Guidelines in the
18 Coronary Care Unit," ORB (December, 1992); Flagle et al.,
19 "AHCPR-NLM Joint Initiative for Health Services Research
20 Information: 1992 Update on OHSRI," ORB (December, 1992);
21 Holzer, "The Advent of Clinical Standards for Professional
22 Liability," ORB (February, 1990); Gottlieb et al., "Clinical
23 Practice Guidelines at an HMO: Development and Implementation
24 in a Quality Improvement Model," ORB (February, 1990); Borbas
25 et al., "The Minnesota Clinical Comparison and Assessment

1 Project," ORB (February, 1990); Weiner et al., "Applying
2 Insurance Claims Data to Assess Quality of Care: A
3 Compilation of Potential Indicators," ORB (December, 1990);
4 Wakefield et al., "Overcoming the Barriers to Implementation
5 of TQM/CQI in Hospitals: Myths and Realities," ORB (March,
6 1993); Donabedian, "The Role of Outcomes in Quality
7 Assessment and Assurance," ORB (November, 1992); Dolan et
8 al., "Using the Analytic Hierarchy Process (AHP) to Develop
9 and Disseminate Guidelines," ORB (December, 1992); Hadorn et
10 al., "An Annotated Algorithm Approach to Clinical Guideline
11 Development," JAMA (June 24, 1992); Falconer et al., "The
12 Critical Path Method in Stroke Rehabilitation: Lessons from
13 an Experiment in Cost Containment and Outcome Improvement,"
14 ORB (January, 1993); Reinertsen, "Outcomes Management and
15 Continuous Quality Improvement: The Compass and the Rudder,"
16 ORB (January, 1993); Mennemeyer, "Downstream Outcomes: Using
17 Insurance Claims Data to Screen for Errors in Clinical
18 Laboratory Testing," ORB (June, 1991); Iezzoni, "Using
19 Severity Information for Quality Assessment: A Review of
20 Three Cases by Five Severity Measures," ORB (December 1989);
21 Kahn, "Measuring the Clinical Appropriateness of the Use of a
22 Procedure," Medical Care (April, 1988); Wall, "Practice
23 Guidelines: Promise or Panacea?," The Journal of Family
24 Practice (1993); Lawless, "A Managed Care Approach to
25 Outpatient Review," Quality Assurance and Utilization Review

1 - Official Journal of the American College of Utilization
2 Review Physicians (May, 1990); Dragalin et al., "Institutes
3 for Quality: Prudential's Approach to Outcomes Management for
4 Specialty Procedures," ORB (March, 1990); Chinsky, "Patterns
5 of Treatment Ambulatory Health Care Management, Physician
6 Profiling - The Impact of Physician, Patient, and Market
7 Characteristics On Appropriateness of Physician Practice in
8 the Ambulatory Setting," (Doctoral Dissertation, The
9 University of Michigan, 1991), published by Concurrent Review
10 Concurrent Review Technology, Inc., Shingle Springs,
11 California; "Patterns of Treatment Ambulatory Health Care
12 Management, Implementation Guide," published by Concurrent
13 Review Concurrent Review Technology, Inc., Shingle Springs,
14 California; "Patterns of Treatment Ambulatory Health Care
15 Management, Patterns Processing Model," published by
16 Concurrent Review Concurrent Review Technology, Inc., Shingle
17 Springs, California; Report on Medical Guidelines & Outcome
18 Research, 4 (February 11, 1993); "Practice Guidelines - The
19 Experience of Medical Specialty Societies," United States
20 General Accounting Office Report to Congressional Requestors
21 (GAO/PEMD-91-11 Practice Guideline) (February 21, 1991);
22 "Medicare Intermediary Manual Part 3 - Claims Process,"
23 Department of Health and Human Services, Health Care
24 Financing Administration, Transmittal No. 1595 (April 1993);
25 CCH Pulse The Health Care Reform Newsletter (April 19, 1993);

1 Winslow, "Report Card on Quality and Efficiency of HMOs May
2 Provide a Model for Others," The Wall Street Journal; Jencks
3 et al., "Strategies for Reforming Medicare's Physician
4 Payments," The New England Journal of Medicine (June 6,
5 1985); Solon et al., "Delineating Episodes of Medical Care,"
6 A.J.P.H. (March, 1967); Health Care (September, 1986) (the
7 entire issue of Volume 24, Number 9, Supplement); Miller et
8 al., "Physician Charges in the Hospital," Medical Care (July,
9 1992); Garnick, "Services and Charges by PPO Physicians for
10 PPO and Indemnity Patients," Medical Care (October, 1990);
11 Hurwicz et al., "Care Seeking for Musculoskeletal and
12 Respiratory Episodes in a Medicare Population," Medical Care
13 (November, 1991); Gold, "The Content of Adult Primary Care
14 Episodes," Public Health Reports (January-February, 1982);
15 Welch et al., "Geographic Variations in Expenditures for
16 Physicians' Services in the United States," The New England
17 Journal of Medicine (March 4, 1993); Schneeweiss et al.,
18 "Diagnosis Clusters: A New Tool for Analyzing the Content of
19 Ambulatory Medical Care," Medical Care (January, 1983);
20 Showstack, "Episode-of-Care Physician Payment: A Study of
21 Coronary Arter Bypass Graft Surgery," Inquiry (Winter,
22 1987); Schappert, "National Ambulatory Medical Survey: 1989
23 Summary," Vital and Health Statistics, U.S. Department of
24 Health and Human Services, Public Health Service, Centers for
25 Disease Control, National Center for Health Statistics

(April, 1992) (DHHS Publication No. [PHS] 92-1771); Graves,
"Detailed Diagnoses and Procedures, National Hospital
Discharge Survey, 1990," Vital and Health Statistics, U.S.
Department of Health and Human Services, Public Health
Service, Centers for Disease Control, National Center for
Health Statistics (June, 1992) (DHHS Publication No. [PHS]
92-1774); "National Hospital Discharge Survey: Annual
Summary, 1990," Vital and Health Statistics, U.S. Department
of Health and Human Services, Public Health Service, Centers
for Disease Control, National Center for Health Statistics
(June, 1992) (DHHS Publication No. [PHS] 92-1773);
"Prevalence of Selected Chronic Conditions: United States,
1986-88," Vital and Health Statistics, U.S. Department of
Health and Human Services, Public Health Service, Centers for
Disease Control, National Center for Health Statistics
(February, 1993) (Series 10, No. 182); "Current Estimates
From the National Health Interview Survey, 1991," Vital and
Health Statistics, U.S. Department of Health and Human
Services, Public Health Service, Centers for Disease Control,
National Center for Health Statistics (February, 1993) (DHHS
Publication No. [PHS] 93-1512); Iezzoni et al., "A
Description and Clinical Assessment of the Computerized
Severity Index," ORB (February, 1992); Health Care Financing
Review, p. 30 (Winter, 1991); Statistical Abstract of the
United States (1992); and Health and Prevention Profile -

1 United States (1991) (published by U.S. Department of Health
2 and Human Services, Public Health Service, Centers for
3 Disease Control, National Center for Health Studies), each of
4 which is hereby incorporated by reference in its entirety for
5 the material disclosed therein.

6 Additional background materials to which the reader is
7 directed for both background and to refer to while studying
8 this specification include: Physicians' Current Procedural
9 Terminology CPT '94, published by American Medical
10 Association, Code it Right Techniques for Accurate Medical
11 Coding, published by Medicode Inc., HCPCS 1994 Medicare's
12 National Level II Codes, published by Medicode Inc., Med-
13 Index ICD 9 CM Fourth Edition 1993, published by Med-Index,
14 each of which is hereby incorporated by reference in its
15 entirety for the material disclosed therein.

16 17 II. SUMMARY OF THE INVENTION

18 It is an object to provide a mechanism for assessing
19 medical services utilization patterns. The invention
20 achieves this object by allowing comparison processing to
21 compare an individual treatment or a treatment group against
22 a statistical norm or against a trend.

23 It is an object of the invention to provide a mechanism
24 for converting raw medical providers billing data into an
25 informative ~~historical~~ database. The invention achieves this

1 object by read, analyze and merge ("RAM") processing coupled
2 with claims edit processing to achieve a reliable, relevant
3 data set.

4 It is an object of the invention to provide a mechanism
5 for accurately determining an episode of care. The invention
6 achieves this object by providing a sequence of steps which,
7 when performed, yield an episode of care while filtering out
8 irrelevant and inapplicable data.

9 It is an object of the invention to provide a method for
10 performing a look-up of information, that is, providing a
11 mechanism for gaining access to different parts of the
12 informational tables maintained in the database. This object
13 is achieved by reviewing the referenced tables for specific
14 codes representing specific diagnoses. The codes are
15 verified for accuracy. Then tables are accessed to display
16 selected profiles. Users are then given the opportunity to
17 select profiles for comparison.

18 It is an object of the invention to provide a method for
19 comparing profiles. This object is achieved by comparing
20 index codes against historical reference information ~~stored~~
21 ~~in the parameter tables~~. Discovered information is checked
22 against defined statistical criteria ~~in the parameter tables~~.
23 The process is repeated for each index code and its ^{profiles} ~~profile~~
24 developed in the history process as many times as necessary
25 to complete the information gathering.

1 It is an object of the invention to create, maintain and
2 present to the user a variety of report products. These
3 reports are provided either on-line or in a hard copy format.
4 The process of creating, maintaining and presenting these
5 reports is designed to present relevant information in a
6 complete and useful manner.

7 It is an object of the invention to provide a mechanism
8 for creating a practice parameter database. This object is
9 achieved in the invention by repetitive episode of care
10 processing and entry of processed episode of care data into a
11 data table until the populated data table becomes the
12 practice parameter database.
13

14 III. BRIEF DESCRIPTION OF THE DRAWINGS

15 Figure 1 depicts steps performed in the method of the
16 invention to establish a practice parameter or utilization
17 profile for a particular diagnosis.

18 Figure 2 depicts an episode of care for a single disease.

19 Figure 3 depicts an episode of care for concurrent
20 diseases.

21 Figure 4 depicts potential outcomes for an episode of
22 care.

23 Figure 5 depicts phases of an episode of care.

24 Figure 6-8 depicts processing of data before episode of
25 care processing begins.

1 Figure 9 depicts episode of care processing.
2 Figure 10 depicts principle elements of the invention and
3 their relationship to each other.
4 Figure 11 depicts the process of the preferred embodiment
5 of the Read, Analyze, Merge element of the invention.
6 Figure 12 depicts the process of the preferred embodiment
7 of the Episode of Care element of the invention.
8 Figure 13 depicts the process of the preferred embodiment
9 of the Look-up element of the invention.
10 Figure 14 depicts the process of the preferred embodiment
11 of the Subset Parameter Look-up component of the Look-up
12 element of the invention.
13 Figure 15 depicts the process of the preferred embodiment
14 of the Profile Comparison element of the invention.

15 IV. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

16 The invention includes both a system and a method for
17 analyzing healthcare providers' billing patterns, enabling an
18 assessment of medical services utilization patterns. When
19 the invention is employed, it can readily be seen whether a
20 provider or multiple providers are overutilizing or
21 underutilizing services when compared to a particular
22 historical statistical profile. The statistical profile of
23 the invention ^{are} ~~is~~ a statically-derived ^{norms} ~~norm~~ based on
24 clinically-validated data which has been edited to eliminate
25

erroneous or misleading information. The profiles may be derived from geographic provider billing data, national provider billing data, the provider billing data of a particular payor entity (such as an insurance company) or various other real data groupings or sets. ^{Multiple}~~Twenty~~ informational tables are used in the database of the preferred embodiment of the invention. These include a Procedure Description Table, ICD-9 Description Table, Index Table, Index Global Table, Index Detail Table, Window Table, Procedure Parameter Table, Category Table, Qualifying Master Table, Specialty Table, Zip/Region Table, ~~Family Table~~, Specialty Statistic Table, Age/Gender Statistic Table, Region Statistic Table, Qualifying Index Table, Qualifying Group Table, Category Parameter Table, ^{and} Duration Parameter Table ~~and~~ ~~Family Table~~. ICD 9 codes or ICD (International Classification of Diseases, generically referred to as a disease classification) codes as they are generally referred to herein are used in the preferred embodiment. In other embodiments of the invention other codes could be used, such as: predecessors or successors to ICD codes or substitutes therefor, such as DSM 3 codes, SNOWMED codes, or any other diagnostic coding schemes. These tables are described in detail as follows. It should be noted, however, that these tables ^{described}~~describe~~ are used by the inventors in one implementation of the invention, and that the inventive

1 concept described herein may be implemented in a variety of
2 ways.

[illegible]

PROCEDURE DESCRIPTION TABLE

This table identifies and validates five years of both CPT (Current Procedural Terminology, generically referred to as an identifying code for reporting a medical service) and HCPCS level II procedure codes. The lifetime occurrence maximum and follow-up days associated with a procedure code are also located in this table.

Code(Key)	Alpha/Numeric	5	Standard CPT or HCPCS(5 Years including Modifiers)
Sub-Code	Character	2	* = Starred Procedures N = New Codes Current Year D1 = Deleted Code Current Year D2 = Deleted Code Previous Year D3 = Deleted Code Third Year D4 = Deleted Code Fourth Year C = Changed Description
Life Time Occurrence	Numeric	2	Number = Count of occurrence in a lifetime Blank = Not applicable
Follow Up Days	Numeric	3	Number of Follow up Days to procedure.
Description	Character	48	Standard abbreviated description

Total

60

1 USE:

- 2 ● This table can validate CPT and HCPCS codes.
- 3 ● Five years of codes will be kept.
- 4 ● Give a brief description of the code.
- 5 ● Gives the maximum number of occurrences that this code can
- 6 be done in a lifetime, if applicable. (Programming not
- 7 addressed, to date)
- 8 ● Give the number of follow up days to a procedure.
- 9 (Programming not addressed, to date)
- 10 ● Modifiers are stored in this table with a "099"
- 11 prefix(i.e., the 80 modifier is "09980") with a
- 12 description of the modifier.
- 13 ● This table interrelates with:
- 14 - Parameter Tables
- 15 - Category Table
- 16 - Qualifying Tables
- 17 - Specialty Table
- 18 - CPT Statistic Table

19 SOURCE:

20 This table is taken from the TB_PROC table from gendbs

21 from prod. The occurrence field is maintained by the

22 Medicode staff.

23

ICD-9 DESCRIPTION TABLE

This table identifies and validates five years of diagnosis codes. It also contains a risk adjustment factor for each diagnosis.

ICD-9 Code(Key)	Alpha/Numeric	5	Left justified, assumed decimal after 3rd position
Sub-Code	Character	2	N = New Code D = Deleted Code C = Changed Code
Indicator	Character	1	* or blank * = code requires 4th and/or 5th digits to be specific
Risk	Alpha/Numeric	2	Overall Classification of Disease
Description	Character	48	Standard abbreviated description

Total 58

USE:

- This table can validate ICD codes.
- Five years of codes will be kept.
- Give a brief description of the code.

- 1 ● Show if the code is incomplete and in need of a fourth or
2 fifth digit.

3 An ICD code which should have a 4th and/or 5th digit is
4 listed with an "*".

- 5 ● This file interrelates with:

- 6 - Index Table
7 - Index Detail Table
8 - Index Global Table
9 - Qualifying Master Table
10 - Family Table
11 - All Parameter Tables

12 SOURCE:

13 ICD codes and description fields are purchased from HCFA
14 (Health Care Financing Administration located in Baltimore,
15 Maryland).

16 The sub-code is maintained by the clinical staff.
17

INDEX DETAIL TABLE

This table ^{identifies} ~~groups~~ ICD-9 codes ^{relevant to each specific index code} ~~into inclusive or exclusive~~
~~diagnosis codes. This grouping is unique to each index code~~
 and is used to drive the search for each episode of care.
 ICD-9 codes have been ~~classified into categories~~ and given an
 indicator which determines whether or not the associated CPT
 code should be included in the episode of care. Also, an
 indicator may cause exclusion of any specific patient record
 from an episode of care ~~summary~~ analysis.

ICD-9 Index Code	Alpha/Numeric or Character	5	Left justified assumed decimal after 3rd position.
Indicator	Character	2	I = Index code R = Related S = signs/symptoms RO = Rule out C = complications (exclude) M = miscoded V = Vcodes MI = Miscoded Index
ICD-9 Beg. = ICD	Alpha/Numeric	5	ICD-9 Beginning Range Code
ICD-9 End. = ICD	Alpha/Numeric	5	ICD-9 Ending Range Code
Update	Character	1	A, C, or Blank

1 Total 17

2 USE:

3 ● This table drives the search for the Episode of Care

4 ~~(EOC). which is keyed off the Index Code.~~

5 ● Other codes to be included in the parameter search are

6 specified in the indicator field. ~~Any one of these ICD~~

7 ~~codes may or may not appear during the search for the~~

8 ~~Index code and still have the EOC be valid.~~

9 ● ICD codes with an indicator of "C" when found in a patient
10 history will disqualify the entire patient from the EOC
11 process.

12 ● Some Index codes are listed in part with "?" and "?? " to
13 exhibit that it does not matter what the trailing 4th
14 and/or 5th digit is, the record is to be accessed for the
15 parameter. For example, the Index code may be 701??,
16 meaning that if the first three digits of the code start
17 with 701 then use the regardless of what the 4th and/or
18 5th digit may be. This is true for all codes starting
19 with 701.

20 ● ICD codes maintained in this table are listed as complete
21 as verified by the ICD description table, with the
22 exception of ICD codes ^{beginning} with an indicator of "M".
23 Programming logic should consider this when using "M"
24 codes in the search process.

- 12
- 1 ^{table}
● This ~~file layout~~ is used for drafting and populating a
2 temporary file built from this table and the Index Global
3 Table based on indicators and keys extrapolated from the
4 Index table.

6 PROGRAM LOGIC TO ASSIGN EPISODE OF CARE

- 7 ● Any patient history with an ICD from the temp file for the
8 chosen Index code is tagged for possible assignment of
9 Episode of Care.
10 ● Perform a search on patient history for any ICD code from
11 temp file with an indicator of "C". If found, exclude
12 entire patient history from EOC search.
13 ● The qualifying tables are accessed to verify if specific
14 qualifying factors apply to determine if patient history
15 meets criteria for determination of valid episode of care.
16 (See Qualifying Tables for further explanation)
17 ● The qualifying table is then accessed for further
18 delineation of qualifying circumstances by EOC.
19 ● A timeline is tracked, by patient, for all potential
20 Episodes of care that may occur for a given patient
21 history.
22 ● The data is arrayed based on profile classes which are
23 eight subsets of Procedure categories. An aggregate of

1 all procedures can also be reported. (See Category Table
2 for further explanation)

3 ● This table interrelates with:

- 4 - ICD Description Table
- 5 - Index Table
- 6 - Index Global Table
- 7 - Parameter Table
- 8 - CPT Statistic Table
- 9 - Age/Sex Table

10 SOURCE:

11 This table is generated and maintained by the Medicode staff.
12
13
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22

INDEX TABLE

This table provides a preliminary ^{step} ~~filter~~ for assigning and accessing different tables during the Episode of Care process. This table houses the assignment of staging and whether or not the Index Global table should be accessed.

ICD-9 ¹ Index Code	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Staging	Character	2	P = preventive A = acute C = chronic L = life threatening M = manifestations
Global Key	Alpha	2	C = complications M1 = miscoded medical vcodes M2 = miscoded surgical vcodes 1 = medical vcodes 2 = surgical vcodes
Indicator	Character	2	C = complications V = vcodes
Update	Character	1	A, C, or Blank

1 Total 12

2 USE:

3 ● This table is used as a preliminary sort for Index codes
4 before the EOC search.

5 ● Once an Index code has been selected, this table is
6 searched for whether or not the global index table needs
7 to be accessed.

8 ● This table assigns the staging for the index code which
9 points to the window table.

10 ● This table interrelates with:

- 11 - ICD Description Table
- 12 - Index Detail Table
- 13 - Index Global Table
- 14 - Window Table

15 SOURCE:

16 This table is generated and maintained by the Medicode staff.
17

INDEX GLOBAL TABLE

This table gives a listing of ICD-9 codes common to most Index codes for either inclusion ^{in an EOC.} such as preventive or aftercare, or exclusion ^{of a patient's history,} such as medical complications.

GLOBAL KEY	Alpha/Numeric	2	C = complications M1 = miscoded medical vcodes M2 = miscoded surgical vcodes 1 = medical vcodes 2 = surgical vcodes
ICD Beginning	Alpha/Numeric	5	ICD-9 Beginning range code
ICD Ending	Alpha/Numeric	5	ICD-9 Ending range code
Update	Character	1	A, C, or Blank

Total

13

USE:

- This table is used to identify a generic V Code or complication ICD code to be used in an EOC search for any Index code.
- It is triggered by the Index table.
- The surgical Vcodes include all M1, M2, 1 and 2's.
- Medical Vcodes include M1 and 1.
- A complication ICD code will negate the use of a patient ^{history} from the EOC search.

- 1 ● A temporary file for the index code is created based on.
2 ICDs extrapolated from this table as well as the Index
3 detail table
4 ● This table interrelates with:
5 - ICD Description Table
6 - Index Table
7 - Index Detail Table

8 ~~SOURCE:~~

9 ~~This table is generated and maintained by the Medicode~~
10 ~~staff.~~

WINDOW TABLE

This table contains the ^{time period} ~~number of days~~ preceding and following an episode of care that must be present without any services provided to the patient relating to the index code or associated codes. These windows are used to define the beginning and end points of an episode of care. This table is driven from the staging field in the index table.

Staging Indicator	Character	2	P = Preventive C = Chronic, A = Acute L = Life threatening, M = Manifestation
Beginning Window	Numeric	3	^{Time period} Number of days for no occurrence of ICD for Index Code
Ending Window	Numeric	3	^{Time period} Number of days for no occurrence of ICD for Index Code
Update	Character	1	A, C, or Blank

Total 9

USE:

- This table is keyed off of the staging ^{indicator} and it tells the program how long of a "Clear Window" is needed on both ends of this EOC for it to be valid.

~~SOURCE: This table is generated and maintained by the PP-staff~~

PROCEDURE PARAMETER TABLE

This table contains the specific CPT codes identified for each index code listed chronologically with associated ~~percentiles, mode, and average. The end user may populate an identical table with their own unique profiles created by analyzing their claims history data.~~

ICD-9 Code ^ Index Code	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Profile	Alpha/Numeric	2	Mnemonic
Procedure	Alpha/Numeric	5	CPT, HCPCS
timeframe	Alpha/Numeric	3	Mnemonic for timeframe or total
50th percentile	Numeric	4	Beginning percentile range
50th percentile	Numeric	4	ending percentile range
75th percentile	Numeric	4	beginning percentile range
75th percentile	Numeric	4	ending percentile range
95th percentile	Numeric	4	beginning percentile range
95th percentile	Numeric	4	ending percentile range
Mode	Numeric	3	Numeric Count
Count	Numeric	7	Number of EOCs for timeframe

Sum	Numeric	7	Number of services for timeframe
Weighting	Numeric	6	Numeric count, assumed decimal (4.2)
Update	Character	1	A, C, or Blank

Total 63

USE:

- This table shows which ^{CPTs} ~~statistically and~~ historically billed, ^{statistically} and how often ^{for a specific Index Code} based on an index ICD code.
- It is keyed off of the index code and the category.

SOURCE:

- All of the field elements are obtained from the Procedure Detail Report.
- Weighting is to be addressed in Phase II of the product.

CATEGORY PARAMETER TABLE

This table contains a listing of the categories identified for each index code listed chronologically with associated percentiles, mode, and average. ~~The end user may populate an identical table with their own unique profiles created by analyzing their claim history data.~~

ICD-9 Code Index Code	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Profile	Alpha/Numeric	2	Mnemonic
Category	Alpha/Numeric	4	category
timeframe	Alpha/Numeric	3	Mnemonic of timeframe or total
50th percentile	Numeric	4	beginning percentile range
50th percentile	Numeric	4	ending percentile range
75th percentile	Numeric	4	beginning percentile range
75th percentile	Numeric	4	ending percentile range
95th percentile	Numeric	4	beginning percentile range
95th percentile	Numeric	4	and ending percentile range
Mode	Numeric	3	Numeric Count, assumed decimal (4.2)
Count	Numeric	7	Number of EOCs for the timeframe

Sum	Numeric	7	Number of services for the timeframe
Update	Character	1	A, C, or Blank

Total 56

USE:

- This table shows ^{which procedural categories are} ~~which categories are statistically and~~ ^{historically billed, and how often} ~~based on an index ICD~~ ^{code.} ~~code.~~

- ~~It is keyed off of the index code and the category.~~

SOURCE:

- ~~All of the field elements are obtained from the Parameter Timeframe report.~~

DURATION PARAMETER TABLE

EOC duration distribution
 This table contains the ~~length of time associated with an~~
~~episode of care for a given Index code.~~ NOTE: ~~The end user~~
~~may populate an identical table with their own unique~~
~~profiles created by analyzing their claims history data.~~

ICD-9 ^ Index Code	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Profile	Alpha/Numeric	2	Mnemonic
50th percentile	Numeric	4	beginning range
50th percentile	Numeric	4	ending range
75th percentile	Numeric	4	beginning range
75th percentile	Numeric	4	ending range
95th percentile	Numeric	4	beginning range
95th percentile	Numeric	4	ending range
Mode	Numeric	3	beginning and ending range
Update	Character	2	A = Add C = Change

Total 36

USE:

- INS
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8
- This table ~~stores the projected length of an episode of~~ care for a given index code.
 - It interrelates with:
 - Index Detail table
 - Parameter table
 - It ~~is~~ populated from the statistical analysis for each Index code.

CATEGORY TABLE

This table provides a grouping of CPT codes into categories of similar services.

Category	Alpha/Numeric	4	Mnemonics
CPT Beg - CPT	Alpha/Numeric	5	Beginning CPT Range
CPT End - CPT	Alpha/Numeric	5	Ending CPT Range
Update	Character	1	A, C, or Blank

Total 15

USE:

- 19 ● Procedure codes have been categorized according to most
20 likely type of service they may represent. It could be
21 characterized as a sorting mechanism for procedure codes.
- 22 ● The ~~mnemonic~~ used for this category is as follows:
- 23 E₁ = Major E and M E₂ = Minor E and M

1 L₁ = Major Laboratory L₂ = Minor Laboratory

2 R_{D1} = Major Diagnostic Radiology R_{D2} = Minor Diagnostic
3 Radiology

4 R_{T1} = Major Therapeutic Radiology R_{T2} = Minor Therapeutic
5 Radiology

6 O₁ = Major Oncology Radiology O₂ = Minor Oncology
7 Radiology

8 M_{D1} = Major Diagnostic Medicine M_{D2} = Minor Diagnostic
9 Medicine

10 M_{T1} = Major Therapeutic Medicine M_{T2} = Minor Diagnostic
11 Medicine

12 S_{D1} = Major Diagnostic Surgery S_{D2} = Minor Diagnostic
13 Surgery

14 S_{T1} = Major Therapeutic Surgery S_{T2} = Minor Therapeutic
15 Surgery

16 A₁ = Major Anesthesia A₂ = Minor Anesthesia

17 P₁ = Pathology J = Adjunct

- 18 ● Categories are also used for arraying Episodes of Care
19 into profile classes or can be reported as an aggregate.
20 The subsets of the aggregate are:

21
22 0 Common Profile ~~A₁, A₂, P₁, E₁, E₂, L₁, L₂, R_{D1}, R_{D2}, M_{D1},~~

23 ~~M_{D2}, S_{D1}, S_{D2}. (All of these categories are included as~~

24 ~~part of the other seven profile classes~~

1 Surgery/Radiation/Medicine Profile - ~~All Categories~~

2 Medicine/Radiation Profile ~~$M_{T1}, M_{T2}, R_{T1}, R_{T2}, O_1, O_2$~~

3 Surgery/Radiation Profile ~~$S_{T1}, S_{T2}, R_{T1}, R_{T2}, O_1, O_2$~~

4 Surgery/Medicine Profile ~~$S_{T1}, S_{T2}, M_{T1}, M_{T2}$~~

5 Radiation Profile ~~R_{T1}, R_{T2}, O_1, O_2~~

6 Medicine Profile ~~M_{T1}, M_{T2}~~

7 Surgery Profile ~~S_{T1}, S_{T2}~~

9 ● This table interrelates with:

- 10 - Parameter Table
- 11 - Qualifying Tables
- 12 - Procedure Table

13 SOURCE:

- B
- 14 ● ~~Maintained by the clinical staff~~
- 15
- 16

QUALIFYING MASTER TABLE

This table provides a preliminary ^{step} filter for determining qualifying circumstances that may eliminate a patient history for determination of an Episode of Care. It also provides the initial sort of an episode of care for a specific profile class.

Index Code	Alpha/Numeric	5	Left justified, assumed decimal after 3rd position
Scope	Alpha	1	P = Patient E = Episode of Care B = Both
Profile	Alpha/Numeric	2	Mnemonic or Blank
Group	Alpha/Numeric	5	Correlates to group ID in Qualifying Group Table
Update	Character	1	A, C, or Blank
Total		14	

USE
Use:

- Preliminary select for where in EOC process qualifying circumstances should apply.
- This table interrelates with:
 - Index Detail Table

1 - Qualifying Group Table

2 Logic:

- 3 ● The Qualifying Master Table outlines the Index code, where
4 in the data search the qualifying search is to occur and
5 what qualifying groups are associated with the index code.
6 The locations include P = patient search, E = Episode of
7 Care search, or B = search in both.

- 8 ● The Profile field is numbered based on the 8 different
9 profiles outlined under the category table. If blank, a
10 profile is not relevant. They are as follows:

- 11 0. Common Profile
12 1. Surgery/Medicine/Radiation Profile
13 2. Medicine/Radiation Profile
14 3. Surgery/Radiation Profile
15 4. Surgery/Medicine Profile
16 5. Radiation Profile
17 6. Medicine Profile
18 7. Surgery Profile

- 19
20
21 ● The Group field assigns a 5 byte mnemonic that establishes
22 a set of qualifying rule sets for a given index code.
23 This field keys directly to the Qualifying Group Table.
24 The majority of the groups relate to profile classes.
25 They are as follows:

1 ALL (Surgery/Medicine/Radiation Profile)

2 MRPRO (Medicine/Radiation Profile)

3 SRPRO (Surgery/Radiation Profile)

4 SMPRO (Surgery/Medicine Profile)

5 RPRO (Radiation Profile)

6 MPRO (Medicine Profile)

7 SPRO (Surgery Profile)

8 CPRO (Common Profile)

9 There are 3 other groups which establish a set of
10 qualifying circumstances based on the occurrence of a
11 particular procedure or diagnosis. These are as follows:

12 SURG Certain Index codes are commonly associated with an
13 invasive procedure which should be present during
14 the course of treatment.

15 MED Certain Index codes are commonly associated with an
16 E/M service which should be present during the
17 course of treatment.

18 ONLY The Index code must occur at least twice on
19 different dates of service over the course of
20 treatment. This group looks only for this
21 occurrence. No specific procedure is to be sought
22 in conjunction with the Index code.

23 Source:

24 ● Table maintained by Clinical staff.

QUALIFYING GROUP TABLE

This Table groups certain qualifying circumstances to aid in an efficient search for data meeting the criteria.

Group	Alpha/Numeric	5	Left justified assumed decimal after 3rd position
Rule Type	Alpha/Numeric	2	II = Index Code specific rule IS = specific ICD code rule IC = multiple ICD to category rule CC = Multiple code rule CS = code specific rule IG = ICD to gender rule LA = ICD to age rule
Rule Identifier	Alpha/Numeric	1	T = True F = False (toggle) M = Male F = Female if IG rule type
Number required	numeric	2	number value
Update	Character	1	A, C, or Blank

Total

15

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USE:

- To act as a preliminary qualifying mechanism for determining if claims information can be used in the assignment of a parameter.
- This table interrelates with:
 - Qualifying Index Table
 - Qualifying Code Table
 - Qualifying Master Table
- A rule type (or rule types) is assigned by group delineating if the rule applies to a single or multiple ICD, single or multiple CPT or category or any combination thereof.
- The rule identifier is an assigned mnemonic based on what the rule is to achieve.
- The Logical indicates if the rule is positive or negative (inclusionary or exclusionary)
- The ^{Number Required}~~number required~~ is a count of the number of occurrences_{required} for the rule to be valid.

Logic:

- The Group Id is driven by the groups assigned in the Qualifying master table. All qualifying rule sets assigned to a given group should be performed to determine the qualifying circumstances for a given index code. See Qualifying Master Table for an explanation of each group.

1 • The Rule Type is a mnemonic which assigns a common type of
2 logic that is to be implemented in the search for the
3 qualifying circumstances. It is possible that the same
4 rule type could be associated with many different rule
5 identifiers. The rule type will also point to either the
6 Qualifying Index Table or the Qualifying Code Table as
7 determined by the first byte of the field. The following
8 is a listing of the rule types:

9 Rule Types associated with Qualifying Index Table:

10 II This related directly to the Index code only.

11 IC This rule is for any indicated ICD code associated with
12 the Index code as it relates to a category or
13 procedure.

14 IS This rule is for a specific indicated ICD code
15 associated with the Index code as it relates to a
16 category or procedure.

17 IG This rule is for any indicated ICD code associated with
18 the Index code as it relates to age. The age ranges to
19 be used are:

20 0-1 = newborn/infant

21 1-4 = early childhood

22 5-11 = late childhood

23 12-17 = adolescence

24 18-40 = early adult

25 41-64 = late adult

65-99 = geriatric

12-50 = female childbearing age

Rule Types associated with Qualifying Code Table:

(Additional rule types may be added when necessary for phase II of the product.)

CC This rule is for a specific procedure or category as it relates to another specific procedure or category for any ICD code associated with the Index code.

CS This is for a specific procedure or category as it relates to a specific ICD code associated with the Index code.

- The Rule Identifier is a further break out of the qualifying circumstances for a group. Most of the rule Ids relate directly to components of a given profile to be included or excluded. For example the rule ID of MMR relates directly to the group of MRPRO and delineates that the further breakout is for Radiation.

The other 3 major rule Ids relate directly to the remaining 3 groups. These are:

Group	Rule ID
ONLY	O
SURG	S
MED	M

- 1 ● The logical is a toggle for whether the rule is true or
2 false. If the rule type is IG, the toggle is for Male or
3 Female.
4 ● The number required is a count for the minimum occurrence
5 that the qualifying circumstance can occur.

6 SOURCE:

- 7 ● To be maintained by clinical staff

8 **QUALIFYING INDEX TABLE**

9 Table houses ~~common~~ qualifying circumstances based on
10 presence or non-existence of given procedures and/or ICD
11 codes that would qualify or disqualify a patient history in
12 the determination of an Episode of Care.

13

Rule Type	Alpha/Numeric	2	II = Index Code specific rule IS = specific ICD code rule IC = multiple ICD to category rule IA = ICD to age rule EG = ICD to gender
Rule Identifier	Alpha/Numeric	4	assigned from Qualifying Master Table

14

Indicator	Alpha/Numeric	2	I = Index code R = Related S = signs/symptoms RO = Rule out M = miscoded V = Vcodes MI = Miscoded Index or Blank
Code	Alpha/Numeric	5	category, CPT, HCPCS, ICD or blank
Update	Character	1	A, C, or Blank

Total

14

USE:

- To act as a qualifying mechanism for determining if claims information can be used in the assignment of ^{an EOC} ~~a parameter~~
- This table interrelates with:
 - Procedure Table
 - Category Table
 - Qualifying Group Table
 - ICD Description Table
 - Index Detail Table
- All rules generated from this table deal with an ICD code driven by the indicator, regardless of the Index code. If

1 the rule is ICD only, then the procedure is blank. If the
2 rule is ICD and procedure, then the indicated ICD must
3 correlate with a procedure code or category.

- 4 ● If the indicator is blank, then all indicators should be
5 considered for qualifying circumstances. Listing a
6 specific indicator causes a qualifying search on the
7 associated indicator only.

8 Logic:

- 9 ● The first two fields of the Qualifying Index Table
10 reiterates the rule type and rule identifier as outlined
11 in the Qualifying Group table. Both of these fields are
12 key.
- 13 ● The indicator correlates to the indicators in the Index
14 Detail table. If the field is blank, all ICDs for the
15 index code should be sought for the rule.
- 16 ● The code filed could be a CPT, HCPCS, category or ICD
17 code. If this field is blank, no specific code or
18 category should be sought for the rule.

19 SOURCE:

- 20 ● To be maintained by clinical staff

QUALIFYING CODE TABLE

Table houses ~~common~~ qualifying circumstances based on the presence or non-existence of a ^{specific} ~~given~~ combination of procedure codes that would qualify or disqualify a patient history in the determination of an Episode of Care.

Rule Type	Alpha/Numeric	2	CC = Multiple code rule CS = code specific rule
Rule Identifier	Alpha/Numeric	4	As labeled in Qualifying Master Table
Primary code	Alpha/Numeric	5	CPT, HCPCS or category or ICD
Secondary Code	Alpha/Numeric	5	CPT, HCPCS or category or ICD
Update	Character	1	A, C, or Blank

Total 14

USE:

- To act as a qualifying mechanism for determining if claims information can be used in the assignment of ^{an EOC} ~~a~~ parameter.
- This table interrelates with:
 - Procedure Table
 - Category Table
 - Qualifying Group Table
- All rules generated from this table have to do with a procedure or ~~category~~ driven by the qualifying master

1 table. The rule relates to the procedure or category as
2 listed in the primary and secondary fields.

3 Logic:

- 4 ● The first two fields of the Qualifying Index Table
5 reiterates the rule type and rule identifier as outlined
6 in the Qualifying Group table. Both of these fields are
7 key.
- 8 ● The Primary code is the driving code in the rule search
9 for the qualifying circumstance. It can be a CPT, HCPCS,
10 category or ICD code.
- 11 ● The Secondary code is the code that must be associated
12 with the primary code in the rule search for the
13 qualifying circumstance. It can be a CPT, HCPCS, category
14 or ICD code.

15 SOURCE:

- 16 ● To be maintained by clinical staff.

SPECIALTY TABLE

Table provides a listing of medical specialties with an assigned numeric identifier. ~~This is standard HCFA information.~~

Specialty (Key)	Alpha/Numeric	3	Medicare specialty indicator
CPT ^A Beg-CPT	Alpha/Numeric	5	Beginning CPT to include
CPT ^A End-CPT	Alpha/Numeric	5	Ending CPT to include
Update	Character	1	A, C. or Blank

Total

14

USE:

This table is used to specify which Specialty is most commonly used with which CPT.

A description of the specialty will be in the documentation.

SOURCE:

This table will be taken from the list Med-Index Publications maintains (available from Medicode, Inc. located in Salt Lake City, Utah).

ZIP/REGION TABLE

Table provides a listing of geographical zip codes sorted into 10 regional zones, standard HCFA information.

Region Indicator	Alpha/Numeric	2	Medicares Ten Regions
Zip Code Beg-Zip Code	Numeric	5	Beginning Zip Code Range
Zip Code End-Zip Code	Numeric	5	Ending Zip Code Range
Update	Character	1	A, C, or Blank

Total

13

USE:

This table is used to specify which Medicare Region to use for the statistic table.

SOURCE:

This will be generated by Medicode, Inc. staff.

SPECIALTY STATISTIC TABLE

Table provides a listing of medical specialties with an assigned numeric identifier. ~~This is standard HCFA information.~~

ICD-9 Code ^ Index	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
----------------------------------	---------------	---	----------------------------------------------------

Specialty	Alpha/Numeric	3	
¹ CPT Code ¹ Beg CPT Code	Alpha/Numeric	5	Beginning Range (Service Area)
¹ CPT Code ¹ End CPT Code	Alpha/Numeric	5	Ending Range (Service Area)
Category	Alpha/Numeric	4	Mnemonic
Multiplier	Numeric	6	Implied decimal (4.2)
Update	Character	1	A, C, or Blank

Total

29

USE:

This table is a matrix that is directly tied to the parameter table by the index code. Its purpose is to give a numeric multiplier that is applied to the occurrence field in the parameter table, to vary the parameter by service area and/or sex and/or region. (i.e., if the occurrence is 2 and the multiplier for a specialist is 1.5, the specialist may receive a total of 3.)

If multiple multipliers are used, compute the average of them and use that.

SOURCE:

This table will be generated by the computer using the extended data set, and validated clinically by the clinical staff.

AGE/GENDER STATISTIC TABLE

Table provides a listing of each CPT code for an index code with a numerical factor used to adjust the frequency of each code by age and/or gender specific data analysis.

ICD-9 Code Index	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Age	Alpha/Numeric	2	00-99
Sex	Alpha/Numeric	1	M, F or Blank
Category	Alpha/Numeric	3	Mnemonic
Multiplier	Decimal	6	Implied decimal (4.2)
Update	Character	1	A, C, or Blank

Total 18

USE:

This table is a matrix that is directly tied to the parameter table by the index code. Its purpose is to give a numeric multiplier that is applied to the occurrence field in the parameter table, to vary the parameter by service area and/or sex and/or region. (i.e. if the occurrence is 2 and the multiplier for a male is 1.5, the male may receive a total of 3.)

Sup
1 b7
2 If multipliers are used, compute the average of them and
3 use that.

4 SOURCE:

5 This table will be generated by the computer using the
6 extended data set, and validated clinically by the
7 clinical staff
8

9 **REGION STATISTIC TABLE**

10 Table provides a listing of CPT ^{codes} ~~code~~ for an index code
11 with a numerical factor used to adjust the frequency of each
12 code by regional data analysis.

13

14 ICD-9 Code Index	Alpha/Numeric	5	Left justified assumed decimal after 3rd position.
Region	Alpha/Numeric	2	Medicares Ten Regions
Multiplier	Decimal	6	Implied decimal (4.2)
Update	Character	1	A, C, or Blank

15
16
17

18 Total 14

19 USE:

20 This table is a matrix that is directly tied to the
21 parameter table by the index code. Its purpose is to give
22 a numeric multiplier that is applied to the occurrence

1 field in the parameter table, to vary the parameter by
2 service area and/or sex and/or region. (i.e., if the
3 occurrence is 2 and the multiplier for a region is 1.5,
4 the region may receive a total of 3.)
5 If multiple multipliers are used, compute the average of
6 them and use that.

8 **SOURCE:**

9 This table will be generated by the computer using the
10 extended data set, and validated clinically by the
11 clinical staff.

12 **FAMILY TABLE**

13 Table provides a listing of ICD-9 codes which have been
14 clustered into family groupings.

Family Description	Character	24	Name of Family/Cluster
ICD-9 Code	Alpha/Numeric	5	Beginning ICD-9 Range
ICD-9	Alpha/Numeric	5	Ending ICD-9 Range

18
19 Total 34

20 **USE:**

21 This table is used for in-house purposes only.
22 It provides a listing of a ICD Family/Cluster with a
23 description of the Family/Cluster.

~~SOURCE:~~

This table is generated and maintained by the clinical staff.

[illegible]

FILE LAYOUT FOR CLAIMS DATA CONTRIBUTION

We prefer Electronic Media Claims National Standard Format; however, if you are not using EMC the following is our suggested layout. Please include an exact layout of the format you use with your submission. The record layout that follows is for each line item that appears on a claim. The charge (field 19) should be the non-discounted fee-for-service. There should be no aggregation or fragmentation.

Field Number	Description	Length	Alpha/ Numeric	Comments
1.	Rendering Provider ID	15	A/N	Unique provider identification number or SSN
2.	Billing Provider ID	15	A/N	Unique provider identification number or SSN
3.	Provider Specialty	3	A/N	Supply a List of Specialty codes used
4.	Patient ID	17	A/N	Unique patient ID number or SSN. May be an encrypted or encoded format.
5.	DOB	8	N	Patient Date of Birth MMDDYY
6.	Sex	1	A	M = Male, F = Female
7.	Subscriber ID	25	A/N	Insured's I.D. No., Normally SSN
8.	Relationship	1	N	Patient to Subscriber, 1 = Self, 2 = Spouse, 3 = Dependent
9.	Bill ID	15	A/N	Unique claim/bill identification number
10.	From Date of Service	6	N	MMDDYY
11.	To Date of Service	6	N	MMDDYY
12.	Provider Zip	5	N	Standard 5 digit Zip Code
13.	Place of Service	2	A/N	Supply a list of POS codes used
14.	Type of Service	2	A/N	Supply a list of TOS codes used
15.	Procedure Code	5	N	Submitted CPT or HCPC code
16.	Modifier	2	N	Submitted CPT modifier
17.	2nd Modifier	2	N	If multiple modifiers are submitted, show the second modifier used. Anesthesia Modifiers (P1-P6)
18.	Claim type	3	A/N	Payor Class Code-W/C, HCFA, Medicaid etc.
19.	Charge	5	N	Billed amount, right justified, whole dollars
20.	Allowed Amount	5	N	Right justified, whole dollars

21.	# of days/units	5	N	number of days and/or units
22.	Anesthesia time	3	N	Actual Minutes
23.	ICD1	5	A/N	First diagnostic code attached to procedure
24.	ICD2	5	A/N	Second diagnostic code attached to procedure (Both ICD1 & ICD2 are left justified, assumed decimal after 3rd byte)
25.	ICD3	5	A/N	Third diagnostic code attached to procedure
26.	ICD4	5	A/N	Fourth diagnostic code attached to procedure
27.	Out-patient facility	5	A/N	Outpatient facility/outpatient hospital identifier
28.	Revenue Code	3	N	Revenue center code

ACCEPTABLE MEDIA TYPES

- * 9 track tape: 1600 or 6250 BPI, ASCII or EBCDIC, Labeled or Unlabeled, Unpacked data, Fixed record lengths
- * Floppy disk; 3.5" (1.44Mb or 720K) or 5.25" (1.2Mb or 360K), Standard MS-DOS formatted disk, ASCII fixed record length or delimited file
- * DC 600A or DC 6150 cartridge : "TAR" or single ASCII or EBCDIC file, Unpacked data, Fixed record lengths
- * 8 mm Exabyte tape: "TAR" or single ASCII or EBCDIC file, Unpacked data, Fixed record lengths
- * 3480 cartridge: Unpacked data, Fixed record lengths, Compressed or Uncompressed
- * Maximum Block size 64,280

DATA PROCESSING METHODOLOGY

This invention is a process for analyzing healthcare providers' billing patterns to assess utilization patterns of medical services. The method of the invention incorporates a set of statistically derived and clinically validated episode of care data to be used as a paradigm for analyzing and comparing providers' services for specific diagnoses or medical conditions. This invention utilizes a series of processes to analyze the client's healthcare claims history to create unique parameters. In its preferred embodiment, the invention is implemented in software. The invention provides the following functions or tools to the client: creation of local profiles, display of profiles and comparison of profiles.

1 The creation of local profiles function gives the client the
2 ability to develop unique episode of care profiles utilizing
3 their own claims history data. The process for creating these
4 profiles is identical to the process used in the development of
5 the reference profiles.

6 The display of profiles function provides a look-up
7 capability for information stored in the reference tables or in
8 client generated ^{profile} ~~profiles~~ tables. This look-up capability may be
9 displayed on the computer screen or viewed as a hard-copy ^{printout} ~~print~~
10 out.

11 The comparison of profiles function provides a comparison
12 between any two profile sources with attention to variance
13 between them. ^{Some examples include} ~~This includes~~ comparing client specific profiles
14 to reference tables, comparing a specific subset of the client's
15 data (eg, single provider) against either reference tables or the
16 client's profiles, or comparing different subsets of the client's
17 profiles to subsets of reference tables.

18 There are four main processes involved in the invention, as
19 depicted in figure 10. These are Read, Analyze and Merge (RAM),
20 1001, further depicted in figure 11; Episode of Care analysis
21 (EOC), 1002, further depicted in figure 12; Look-up function,
22 1003, further depicted in figures 13 and 14; and Profile
23 Comparison, 1004, further depicted in figure 15. The invention
24 also includes an innovative reporting mechanism. Each of these
25 four main processes and the reporting mechanism is described in
26 detail in the remainder of this section.

27 A. Transforming Raw Data Into an Informative Database

1 Both the RAM and the EOC processes involve healthcare claims
2 history search and analysis. The intent of the RAM and the EOC
3 claims history processing is to enable the end user to establish
4 their own unique profiles based on their existing claims data
5 information. Developing a database of historical provider
6 billing data which will be used to provide the functionality of
7 the invention is the first step in the invention.

8 1. Read, Analyze and Merge ("RAM")

9 In order to define a profile a significant quantity of
10 historical medical provider billing information must be analyzed.
11 As indicated above, the provider billings may come from a variety
12 of sources, with the general guideline that accuracy and
13 completeness of the data and a statistically significant sample
14 of provider billings^{are} required to develop a reliable profile. In
15 the preferred embodiment of the invention, no less than two
16 years of consecutive claims history ~~and about fifty million~~
17 ~~claims~~ are used to develop the profiles. The RAM process
18 verifies existence and validity of all data elements in a claims
19 history before the data is processed to develop a profile. The
20 reader is directed to Figures 1 and 6-8 for pictorial
21 representations of the preferred embodiment of the invention.
22 Figure 1 depicts the high level steps performed in one embodiment
23 of the invention. The data flow shown in Figure 1 includes
24 loading client data 101 from tape 100, reordering various fields
25 103 and performing date of service expansion 104 as necessary.
26 Next, data are merged (combined) 1-5 and sorted 106 to ensure all
27 bill ^{IDs} ~~IDs~~ are grouped together. The data 108 ^{are} ~~is~~ then read,

1 analyzed and merged into an extended data set (EDS) 110.
2 Reporting and any other processing may occur 111 and an Episode
3 of Care database 112 is created. ~~The preferred embodiment of~~
4 ~~this invention.~~ In the preferred embodiment of the invention,
5 the steps of the invention are implemented in a software product
6 referred to as ^{CareTrends} ~~CARE TRENDS~~ available from Medicode, Inc. of Salt
7 Lake City, Utah.

8 Figure 6 depicts read, analyze and merge processing that
9 occurs in the preferred embodiment of the invention. First, one
10 claim at a time the data 603 ^{are} ~~is~~ read 601, ^{crosswalked} ~~crosswalked~~ and
11 scrubbed (filtered) 602. Then a claim is analyzed 604 with ^{the} ~~the~~
12 ^{results} ~~results~~ output to a log file 605. The results in the log file 605
13 are then compared 606 to the original claim data and inserted 607
14 into an extended data set 608.

15 Figure 7 depicts an analytical process of the preferred
16 embodiment that includes initializing 701 RVU and line number for
17 each line of the claim and sorting 702 by RVU (descending) and
18 CPT and charge in order to prepare for proper analysis by CES.
19 Then 703 line items are split into two groupings of surgical
20 assistant modifiers and all other modifiers in separate groups.
21 Each of the two groups is then ^{validated} ~~checked~~ 704 against disease
22 classification codes (ICD 9) ^{and} ~~and~~ procedure edits rules 705 (CES
23 tables) and unbundle/rebundle edits 706 are performed.

24 Figure 8 depicts the merge process of the preferred
25 embodiment of the invention. It includes reading 802 each line
26 ~~of~~ from the log file for ^{the} ~~a~~ current bill, proceeding with processing
27 if the record read is pertinent 804 ^{and} ~~and~~ determining whether to add

1 the record to the extended data set 805-807, ~~(i.e. not adding~~
2 ~~denials, adding rebundles and adding other lines that have not~~
3 ~~been specifically excluded)~~

4 Figure 9 depicts episode of care formation in the preferred
5 embodiment. This processing includes processing the records in
6 the extended data set that relate to the current index code.
7 This relation is determined by the index tables. Then the
8 records are broken into potential episodes of care based on a
9 period of time specified in a window table. Then the episode of
10 care is qualified based on the rules in a qualifying table.
11 Qualifying episodes of care are inserted into the episode of care
12 table.

13 The following text includes a written description of the RAM
14 processing that is performed in the preferred embodiment of the
15 invention. Figure 11 shows the RAM process.

16 The first step in the RAM process is determination of a
17 patient record, 1101. It is necessary to establish a patient
18 record that can be used in the episode of care extraction process
19 (explained in detail below). In the preferred embodiment, a
20 patient record is identified as a unique patient history
21 involving no less than two years of sequential claims history.
22 Because identifying patient information is often removed from
23 patient records to ensure patient confidentiality, patient
24 information such as subscriber/relationship, patient ID, age,
25 gender, bill ID and claim ID may be useful in positively
26 identifying a particular patient. It should be noted that claims
27 history data from various sources may need to be handled

1 differently to identify patient records due to differences in
2 file organization and level of detail of information provided.
3 The amount of information desired to be captured may vary in
4 different embodiments of the invention, but generally the
5 information to be captured is that on a standard HCFA 1500
6 billing form, Electronic Media Claims, UB 82 or UB 92 claim
7 forms, all of which are generally known in the industry.

8 The next step, 1102, is the manipulation of the client file
9 layout to extrapolate or crosswalk the pertinent information in
10 order to conform to the logic of the invention. Examples of this
11 step include: translation of ^{type of service, specialty type} ~~Type of Service or Benefits to~~
12 ~~Specialty type~~, modifiers, and/or place of service information.

13 The next steps involve the validation of claims elements.
14 Each line item of claims history is compared against the
15 Procedure, ^{Description tables} ~~the Description table~~, (such as CPT or HCPCS
16 description tables; ~~HCPCS means Health Care Financing~~
17 ~~Administration Common Procedure Coding System provided by the~~
18 ~~U.S. Government~~; such tables generally are referred to as
19 Description Tables and may contain any coding schemes) and the
20 ICD description tables to validate the codes contained in the
21 line item, 1103. Line items with an invalid code are not
22 included in the remainder of RAM processing, though they are
23 counted for future reference. Line items which indicate services
24 being performed over a period of more than one day are expanded
25 into numerous line items, one for each service performed, 1104.
26 ~~This function is also performed only on CPT codes 10000-99999.~~
27 The services are then each given a unique date of service

1 beginning with the "date of service from" for the first line item
2 and ending with the "date of service to" for the last line item.
3 The last validation step, 1105, is the conversion of old CPT
4 codes to new CPT codes. This step is essential to provide the
5 most accurate statistics relative to physician office and
6 hospital visits (termed Evaluation and Management Services).

7 The last step of the RAM process is to edit all claims for
8 errors, through an appropriate claims edit tool, 1106. In the
9 preferred embodiment, software known as "CLAIMS EDIT SYSTEM"
10 which is available from Medicode, Inc. located in Salt Lake City,
11 Utah is used to detect and correct any duplicate line items or
12 inappropriately billed services. This results in an
13 appropriately processed set of raw data that is now in a
14 condition for episode of care processing. The reader is directed
15 to the RAM source code in the Microfiche Appendix for all details
16 of this processing performed in the preferred embodiment.

17 *FIG 9* 2. Determination of Episode of Care

18 The next step in transforming raw data into a useful
19 database is to determine episodes of care for the data that has
20 already undergone RAM processing. In the invention, a database
21 is created which contains profiles for various diagnoses, chronic
22 and otherwise, including complications indicators. Creation of
23 the database depends on accurately defining an episode of care
24 ("EOC") for each diagnosis. An episode of care is generally
25 considered to be all healthcare services provided to a patient
26 for the diagnosis, treatment, and aftercare of a specific medical
27 condition. The episode of care ~~window~~ for a single disease is

1 depicted in Figure 2. In the simplicity of the figure, it can be
2 seen that for the diagnosis in question, all healthcare services
3 provided between onset and resolution should be incorporated into
4 the database. An example of this would be a patient who has been
5 afflicted with acute appendicitis. The patient's life prior to
6 onset of the acute appendicitis would be considered a disease
7 free state. On some date, the patient would notice symptoms of
8 acute appendicitis (although he may not know the diagnosis) that
9 cause him to seek the attention of a medical provider. That
10 event would be considered the onset. During the disease state,
11 numerous events may occur, such as the patient consulting a
12 family practitioner, consulting a surgeon, laboratory work and
13 surgical services being performed, and follow-up visits with the
14 provider(s). When further follow-up is no longer required,
15 resolution has been reached. Thus an episode of care has been
16 defined and data from that patient's episode of care is used in
17 the invention to construct a profile for the diagnosis applicable
18 to that patient. Without the use of additional logic, however,
19 the use of that definition of an episode of care would result in
20 erroneous data being entered into the ^{EOC} ~~profile~~ database.

21 For example, in Figure 3 it can be seen that a patient
22 suffering from a chronic disease who contracts a second disease
23 could be treated both for the chronic disease and for the second
24 disease during the disease state (i.e. between onset and
25 resolution). If all medical provider billing data during the
26 disease state were entered into the database, then the database
27 would contain erroneous historical data for that individual's

1 diagnosis. For example, if a patient who suffers from psoriasis
2 were to be diagnosed with acute appendicitis and received
3 treatment for psoriasis between the time of onset and resolution
4 of his acute appendicitis, then the provider billings would
5 contain both billings for treatment of the psoriasis and the
6 acute appendicitis. Therefore the invention incorporates methods
7 for discerning medical provider billings ^{relevant} ~~irrelevant~~ to a
8 particular diagnosis. Further, the disease state could be the
9 active state of a chronic disease, and resolution could be the
10 disease returning to its inactive state. A method for handling
11 this situation is therefore also provided.

12 Other alternatives in the course of a disease further
13 complicate accurately defining an episode of care. From Figure 4
14 it can be seen that for any particular diagnosis, the outcome
15 could be resolution, as described above, return to the chronic
16 state of a disease, or complication of the disease. For example,
17 if a patient has undergone an appendectomy, the patient may
18 contract an infection following the surgical procedure. Because
19 complications of various types and durations and in varying
20 frequencies are associated with various diagnoses, a method for
21 incorporating the complication data into the statistically-
22 derived practice parameter is intended to be provided in the
23 invention.

24 Figure 5 depicts the phases of an episode of care, including
25 the sequence of patient workup, treatment, and eventual
26 resolution, return to the chronic state, or complication followed
27 by either resolution or return to the chronic state.

1 The method for defining an entire episode of care provided
2 in the invention is used to construct a database of ^{EOCs} profiles
3 based on billing data that has been filtered to eliminate data
4 irrelevant to the diagnosis which would lead to an erroneous
5 profile. Essential to the determination of an EOC are certain
6 qualifying circumstances. These circumstances are managed
7 through the use of ~~four~~ interrelational qualifying tables, to
8 provide a mechanism for sorting patient history for the
9 occurrence of specific procedures or ICD codes that are requisite
10 for an EOC to be valid.

11 The steps used in the preferred embodiment to determine an
12 episode of care are shown in figure 12 and as follows.

13 a.) Data Sort by Index Code

14 ^{IN} ^{B10} ^{Second, 1201} First, 1201, the raw data set which has undergone RAM
15 processing is sorted by index code (i.e. ^{principal} ~~general~~ diagnosis) to
16 find all patient records ^{with a patient history having an} with occurrence of a particular index
17 code on at least two different dates of service. ~~Second, 1202,~~
18 qualifying ICD codes (specific diagnosis) associated with the
19 index code in question are found by searching patient history for
20 at least one occurrence of the specific category or index code,
21 to be considered in the criteria of an episode of care. Third,
22 1203, during this step patient history records are searched for
23 qualifying circumstances such as procedures relating to specific
24 medical conditions which may ~~have~~ been indicated as usually
25 requiring an Evaluation and Management (E/M) service during the
26 course of treatment. For example, an occurrence of a qualifying
27 circumstance such as an E/M service during the patient history is

Third, 1202,
Fourth, 1204,
1 ~~considered in the criteria of an episode of care,~~
2 ~~once the data history has been searched for qualifying~~
3 ~~circumstances,~~ the valid components of these patient records are
4 then checked against the ^{inter relational qualifying tables} ~~three inter-relational Index Tables~~ to
5 identify ~~qualifying~~ ICD codes associated with the chosen index
6 code. In addition, the patient records are searched for any
7 comorbidity ICD codes that would disqualify the patient record
8 for inclusion in the EOC (such as diabetes ^{or} ~~with~~ renal failure).
9 Records then are given a staging indicator (i.e. chronic, acute,
10 life-threatening, etc.) ~~associated with the index code to~~
11 ~~continue in the EOC process in the determination of windows.~~

Fifth, 1205, a temporary file is created based on combining
12 the authorized and/or disallowed ICD codes that are associated
13 with a given index code in the Index Global Table (listing
14 preventative and aftercare codes) and the Index Detail tables.
15 The temporary file is created using the Index Table Pointers,
16 which determine whether or not the Index Detail Table only should
17 be accessed or whether the Index Global Table is also necessary
18 for drafting the ~~temporary~~ file. Sixth, 1206, for each unique
19 patient record that has been identified as containing the
20 assigned Index code with its associated staging, the entire data
21 set is searched to find the first occurrence of its index code
22 and the date of that record.

24 b.) Determination of Clear Windows

25 Clear window processing defines the onset and resolution
26 points of a ~~diagnosis to establish~~ an episode of care. The
27 actual parameters used in clear window processing may vary in

INS 1A
B 12
various implementations of the invention. ~~Based on the staging~~
indicator, a pre-episode window time period and a post-episode
window time period are selected from the table, 1207. Then,
1208, beginning with the first occurrence of an index code in the
patient record, a search backward in time is made until no
services relating to the diagnosis are found. Then a further
search backward in time is made to determine a pre-episode clear
window. If any of the ICD codes, V-codes or complications codes
found during the data sort by index code processing are found
during this search backward in time that fall outside of the pre-
episode window time period, there is no clear window and that
patient record is rejected and not used. Processing begins again
with the sort by index code for a new patient record. If a clear
pre-episode window has been found, the patient record continues
through post-episode window determination.

Once a clear pre-episode window has been found, a search is
made for a clear post-episode window, 1209. This comprises two
searches forward in time. The first search is to establish the
date of the procedure code in question. Then a further search
forward in time is made for the clear post-episode window. If
the second search to determine the clear post-episode window
reveals any of the ICD codes, V-codes or complications codes
found during the data sort by index code processing are found
outside of the post-episode window time period (as specified by
the staging indicator), there is no clear window and that patient
record is rejected and not used. Processing would begin again
with the sort by index code for a new patient record. If a clear

1 window has been found the patient record can be analyzed for a
2 valid episode of care.

3 c.) Valid Episode of Care

4 ^{Each potential episode}
~~The patient record~~ is then checked to determine if the index
5 code in question appears on ^{the required number of} ~~at least two~~ dates of service. ^{with the EOC 1208} If
6 the index code ^{potential EOC is pending} ~~appears on only one date, the record is rejected.~~

7 The qualifying tables are then checked to determine if the ^{potential EOC} ~~record~~

8 meets the minimum criteria for procedure codes (such as surgical
9 services) that are expected to be found within ^{a potential} ~~an~~ episode of care
10 for a given index code. If the minimum criteria are not found in

11 an episode of care, ~~the patient record will be rejected and it~~
12 ^{continues for all patient records} will not be considered in the profile summary. ~~Processing would~~
13 ~~then resume with a new patient record and data sort by index~~

14 code. Once an EOC has been determined for a set of claims

15 ^{INS 26} ^{BL 13} history meeting the criteria for an Index code, ~~the information~~
16 ~~can be sorted by~~ different combinations of treatment patterns

17 that are likely to arise for a given medical condition, ¹²⁰⁹ ~~1210.~~

18 There are eight basic profile classes which outline the common
19 combinations of treatment patterns to statistically analyze and
20 store. These Profile Classes are:

21 0. Common Profile (diagnostic and E/M services common to
22 all of the above).

23 1. Surgery/Medicine/Radiation Profile

24 2. Medicine/Radiation Profile

25 3. Surgery/Radiation Profile

26 4. Surgery/Medicine Profile

27 5. Radiation Profile

- 1 6. Medicine Profile
- 2 7. Surgery Profile
- 3 8. Summary Profile (summary of 0-7 above)

4 ^{INS}
4 ^{B15} ~~If the patient record contains the minimum criteria for an~~
5 ~~EOC then processing continues with population of the procedure~~
6 ~~and category tables.~~

7 d.) Populating the Procedure and Category Parameter Tables

^{The data from qualified EOCs}

8 ~~Patient records that have not been rejected by this point in~~
9 ~~the process will be added to the procedure and category~~ ^{parameter} ~~tables,~~

10 ¹²¹⁰
10 ¹²¹¹ ~~II. Data from all of the episodes of care for each index code~~

11 are inserted into the parameter tables to create the summary
12 statistical profiles. In the preferred embodiment these tables
13 are accessed by index code and populated with data from all the
14 episodes of care for each index code to create and provide
15 summary statistics. ~~The information generated is driven by the~~
16 ~~index code and is sorted chronologically and by category of~~
17 ~~procedures.~~ The procedure description table and category table
18 are also accessed to determine a description of the procedure
19 codes and the service category in which they fall.

20 The final step of the EOC process is the generation of
21 output reports, ¹²¹¹
21 ¹²¹² ~~II.2~~. The output report of this step can be
22 either ^{an} ~~a~~ online look-up report or a hard copy report. Reports
23 are further described below.

24 The reader is directed to the Microfiche Appendix containing
25 the source code for EOC processing and to Figure 9 for
26 supplementary information.

1 At this point, parameter tables have been created which may
2 be accessed for various purposes. A description of these was
3 listed above.

4 B. Use of the Database

5 1. Look-up Function

6 In the preferred embodiment of the invention, a look-up
7 function is provided so that various information available in the
8 database may be accessed. In general, a specific diagnosis may
9 be reviewed in each of the tables of the database based on ICD
10 code. In various embodiments of the invention, other look-up
11 functions may be provided based on nearly any category of
12 information contained in the database. In the preferred
13 embodiment of the invention display of profiles is performed as
14 part of the look-up function. Information in the procedure and
15 category parameter tables are displayed by index code sorted
16 chronologically to show a profile.

17 The specific steps of the preferred embodiment of the Look-
18 Up function of the invention are shown in figure 13 and described
19 as follows.

20 The first step, 1301, is to review the reference tables for
21 a given Index ICD code. Once a specific diagnosis is chosen for
22 review the process moves to step two. In step two, 1302, the ICD
23 description table is accessed to verify that the ICD-9 code is
24 valid, complete and to provide a description of the diagnosis.
25 It will also indicate a risk adjustment factor assigned to the
26 diagnosis.

1 In step three, the Index tables are accessed, 1303. Next,
2 step four, 1304, is to determine whether or not the chosen ICD
3 code is an Index code. If it is found as an Index code, any
4 additional ICD codes associated with the selected Index code
5 will be accessed, 1305. If a chosen diagnosis is not listed as
6 an index code, a prompt, 1306, will allow a search for the
7 selected ICD code to list which index code(s) it may be
8 associated with and its indicator, 1307. A word search
9 capability, 1308, is included in the look-up function applicable
10 to the Index code display. A word or words of a diagnosis is
11 entered and a search of possible ICD codes choices would be
12 listed.

13 The next step, 1309, is to access the Parameter Tables to
14 display selected profiles. The information provided is driven by
15 the index code and is sorted chronologically, by profile class
16 and by category of procedures. The user is then given the
17 opportunity to choose whether the profiles to be accessed are
18 from the reference tables, client developed profiles, or both,
19 1310. Next the Procedure Description Table, 1311, and the
20 Category Table, 1312, are accessed to ascertain description of
21 procedure codes and categories under which they fall.

22 The last step of the Look-Up function is the output of
23 report product, 1313. This report may either be on-line look-up
24 process or in the hard copy report format.

25 The preferred embodiment of the invention also performs
26 subset profile look-up. This permits analysis of profiles based

on selected subsets of data such as age, gender, region and provider specialty.

The process for the subset of profiles look-up includes all of the steps necessary for the general profiles look-up and includes the following additional steps shown in figure 14 and described below.

The Age/Gender Table is accessed to ascertain the standard age ranges and/or gender selection for a given profile, 1402. This information is stored by index code with an adjustment factor to be multiplied against the occurrence count of each procedure stored in the parameter table. For example, an adjustment factor of 0.6 associated with an age range of 0 to 17 would be calculated against an occurrence count of 10 for CPT code 71021 for Index code 493XX giving an age adjusted occurrence of 6 for that age range.

The Region Statistic Table, 1403, is accessed and used in a similar manner as the Age/Gender Table. This table has adjustment factors based on ten regions throughout the United States.

The Zip/Region Table, 1404, is accessed to identify what region a particular geographic zip code falls within.

The CPT Statistic Table, 1405, is accessed and used in a similar manner as the Age/Gender table. This table has adjustment factors based on different medical specialty groupings.

The Specialty table, 1406, is accessed to ascertain what particular specialty groupings are suggested.

1 The subset parameter Look-Up function also includes the
2 capability of producing output reports, 1407. These reports can
3 be on-line look-up process reports or hard-copy report format
4 reports.

5 2. Comparison Processing

6 In the preferred embodiment of the invention, it is possible
7 to compare profiles developed from a data set against profiles
8 developed from a reference data set. Subsets of profiles may be
9 compared as well. Profiles may be compared for any index code
10 and profile reports may be output. It is also possible to
11 identify those medical providers (whether individuals or
12 institutions) who provide treatment that does not fall within the
13 statistically established treatment patterns or profiles.
14 Further, various treatment patterns for a particular diagnosis
15 can be compared by treatment cost and patient outcome to
16 determine the most effective treatment approach. Based on
17 historical treatment patterns and a fee schedule, an accurate
18 model of the cost of a specific medical episode can be created.

19 The specific process of Comparison Processing is shown in
20 figure 15 and described as follows. The first step, 1501, is the
21 comparison of information developed from the data history search
22 process with reference information stored in the Parameter
23 Tables. The next step, 1502, is to test the services from the
24 history processing to see if it falls within the defined
25 statistical criteria in the Parameter Tables. If it does an
26 indicator is given to this effect, 1504. If the services fall
27 outside the statistical criteria of the reference Parameters

1 Table, a variance alert describing the difference will be given,
2 1503. The process may be repeated for each index code and its
3 profile developed in the history process, 1505. The final step
4 is to produce output reports, 1506. These reports are either on-
5 line look-up process reports or hard-copy report format reports.

6 3. Reporting

7 Reporting of various information contained in the database
8 is provided in the preferred embodiment. Six different types of
9 reports or displays are provided in the preferred embodiment,
10 these are: Provider Practice Profile Report, Profile Comparison
11 Reports, Resident Parameters Display, Local Parameters Display,
12 Parameter Comparison Report and Chronological Forecast. Each of
13 these reports or displays is described as follows.

14 The Provider Practice Profile Report is a set of reports
15 which provide a tally or summary of total CPT and/or ICD code
16 utilization by a provider or group of providers during a
17 specified time interval and allows comparison against provided
18 reference data or client generated reference data.

19 The select criteria for running the tally can be any one of
20 the following:

- 21 - single physician, department, specialty or clinic by CPT
- 22 and/or ICD
- 23 - multiple physicians, departments, specialties, or clinics
- 24 by specialty, region, CPT and/or ICD
- 25 - period of time being analyzed

26 Included in the report is the following:

- 27 - criteria for select

- 1 - claims analyzed
- 2 - average lines per bill
- 3 - invalid CPTs and percent of total for study
- 4 - invalid ICDs and percent of total for study
- 5 - incomplete ICDs and percent of total for study
- 6 - patients in age categories
- 7 - patients by gender
- 8 - missing ICDs and percent of total for study

9 The report includes numerous (up to about 22 in the
10 preferred embodiment) separate procedure (such as CPT) categories
11 which are headers for each page. Each CPT utilized within that
12 category will be reported by:

- 13 - frequency and percent of total
- 14 - dollar impact and percent of total for single or multiple
15 fee schedules and/or allowable reimbursement schedules
- 16 - grand total if more than a single physician report

17 The report includes a tally by ICD. Each ICD utilized is
18 reported on by:

- 19 - frequency and percent of total
- 20 - dollar impact and percent of total for single or multiple
21 fee schedule and/or allowable reimbursement schedules
22 (dollar impact based on each line item CPT correlated to
23 the ICD)

24 If a report includes region and/or specialty, there are
25 numerous tallies for procedure categories and/or ICD.

26 The Profile Comparison Reports give the client a comparison
27 of a health care provider's (or group of providers') utilization

1 of CPT and/or ICD-9 codes in a specific episode of care against a
2 reference set of utilization profiles. This includes number,
3 frequency and chronological order of services along with other
4 statistical information (eg, range, mode, confidence interval,
5 etc . .).

6 The comparison can be against one of the following:

- 7 - national norms resident in the tables
- 8 - regional norms resident in the tables
- 9 - client established norms developed by use of the tally
10 report, outlined above
- 11 - other

12 Selection criteria include the following:

- 13 - single physician, department, clinic or specialty by CPT
14 and/or ICD to be compared against national, regional,
15 specialty, and/or client established norms
- 16 - multiple physicians, departments, clinics, or specialties
17 by CPT and/or ICD by specialty and/or region, to be
18 compared against national, region, specialty, and/or
19 client established norms
- 20 - set period of time being analyzed

21 General information included in the report includes:

- 22 - criteria for select (ie, national, regional, specialty,
23 and/or client established)
- 24 - claims analyzed
- 25 - average lines per bill
- 26 - invalid CPTs and percent of total for study and comparison
- 27 - invalid ICDs and percent of total for study and comparison

- 1 - incomplete ICDs and percent of total for study and
- 2 comparison
- 3 - patients in age categories and comparison
- 4 - patients by gender and comparison
- 5 - missing ICDs and percent of total for study and comparison

6 The report includes numerous separate CPT categories which
7 are headers for each page. Each CPT utilized within that
8 category will be reported by:

- 9 - frequency and percent of total
- 10 - dollar impact and percent of total for single or multiple
- 11 fee schedules and/or allowable reimbursement schedules
- 12 - grand total if more than a single physician report

13 The report includes a tally by ICD. Each ICD utilized is
14 reported on by:

- 15 - frequency and percent of total
- 16 - dollar impact and percent of total for single or multiple
- 17 fee schedule and/or allowable reimbursement schedules
- 18 (dollar impact based on each line item CPT correlated to
- 19 the ICD)

20 If a report includes region and/or specialty, there are
21 numerous tallies for CPT categories and/or ICD.

22 The Resident Parameters Display provides the client a look-
23 up mode for information stored in the Practice Parameter Tables
24 or client generated parameter tables. This look-up should be on
25 the computer screen or as a print out.

26 The selection criteria is based on the key elements of the
27 Practice Parameter tables. For Example:

1 - Index code for associated CPT codes and/or any other the
2 following:

- 3 - index code only
- 4 - index code and indicators (ie, related, complicating,
5 rule/outs, symptoms, etc)
- 6 - specialty
- 7 - region
- 8 - age
- 9 - gender
- 10 - standard length of Episode of Care
- 11 - based on profile (tally)
- 12 - based on parameter (timeline)
- 13 - regional variables
- 14 - other misc. look-ups
- 15 - geozips incorporated in a region
- 16 - CPT for follow up days and/or lifetime occurrence
- 17 - specialty and associated CPT codes
- 18 - ICD and Risk Factor

19 The Local Parameters Display provides the same information
20 as described in the Display of Resident Parameters listed above.

21 The Parameter Comparison Reports are a set of reports which
22 give the client a comparison of a physician (or group of
23 physicians) utilization of CPT and/or ICD against an existing set
24 of utilization norms over a timeline and in chronological order.

25 The comparison can be against one of the following:

- 26 - national norms resident in the tables
- 27 - regional norms resident in the tables

1 - client established norms developed by use of the tally
2 report, outlined above

3 - other

4 Selection criteria include the following:

5 - single physician, department, clinic or specialty by CPT
6 and/or ICD to be compared against national, regional,
7 specialty, and/or client established norms

8 - multiple physicians, departments, clinics, or specialties
9 by CPT and/or ICD by specialty and/or region, to be
10 compared against national, region, specialty, and/or
11 client established norms

12 - set period of time being analyzed

13 General information included in the report includes:

14 - criteria for select (ie, national, regional, specialty,
15 and/or client established)

16 - claims analyzed

17 - average lines per bill

18 - invalid claims due to incomplete Episode of Care

19 - invalid CPTs and percent of total for study and comparison

20 - invalid ICDs and percent of total for study and comparison

21 - incomplete ICDs and percent of total for study and
22 comparison

23 - patients in age categories and comparison

24 - patients by gender and comparison

25 - missing ICDs and percent of total for study and comparison

1 The report includes numerous separate procedure categories
2 which are headers for each page. Each procedure category
3 utilized within that category will be reported by:

- 4 - frequency and percent of total
- 5 - dollar impact and percent of total for single or multiple
- 6 fee schedules and/or allowable reimbursement schedules
- 7 - grand total if more than a single physician report

8 The Chronological Forecast provides statistical trend
9 analysis and tracking of the utilization of billing codes
10 representative of services performed by a physician for a given
11 diagnosis over a set period of time and stored in chronological
12 order. It will provide a summation of billed codes
13 representative of services and diagnoses utilized by an entity
14 over a period of time.

15 C. System Requirements

16 The method and system of this invention may be implemented
17 in conjunction with a general purpose or a special purpose
18 computer system. The computer system used will typically have a
19 central processing unit, dynamic memory, static memory, mass
20 storage, a command input mechanism (such as a keyboard), a
21 display mechanism (such as a monitor), and an output device (such
22 as a printer). Variations of such a computer system could be
23 used as well. The computer system could be a personal computer,
24 a minicomputer, a mainframe or otherwise. The computer system
25 will typically run an operating system and a program capable of
26 performing the method of the invention. The database will
27 typically be stored on mass storage (such as a hard disk, CD-ROM,

1 worm drive or otherwise). The method of the invention may be
2 implemented in a variety of programming languages such as COBOL,
3 RPG, C, FORTRAN, PASCAL or any other suitable programming
4 language. The computer system may be part of a local area
5 network and/or part of a wide area network.

6 It is to be understood that the above-described embodiments
7 are merely illustrative of numerous and varied other embodiments
8 which may constitute applications of the principles of the
9 invention. Such other embodiments may be readily devised by
10 those skilled in the art without departing from the spirit or
11 scope of this invention and it is our intent that they be deemed
12 within the scope of our invention.